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Cow Urine–An Organic Approach to the Management of Diseases and Crop Production in Fig and Sunflower Plants

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Abstract

The disease incidence of rust and defoliations in fig with cow urine spray ranged from 3–4% when compared to control (6 to 8.5%). The cow urine sprayed plot had least mean incidence (4.0%) and defoliation (2.5%) and high yield (6.5 tonnes/ha) compared to control (8.5%), (14.8%) and (3.5 tonnes/ ha) respectively. This is due to the nutrient composition of cow urine which has toxic inhibitory action against fungal growth and multiplication and at the same time it has supplied the required nutrients during different stages of crop growth. The cow urine sprayed plot recorded low incidence of 2.0% of powdery mildew and 2.60% of necrosis, with high seed weight (4.32g/100 seeds) and highest yield of 1545 kg/ha when compared to control plot had high powdery mildew incidence (6.0%) and necrosis disease (12.34%) and lowest yield of 1,070 kg/ha. It leads to the conclusion that nutrient elements and other enzymes present in the cow urine may trigger the systemic acquired resistance of host plant against pathogens, thereby making plant to resistant the pathogens infection.

Key words : Cow urine, Organic approach, Disease management, Sunflower, Fig.

Fig is an important fruit crop of India grown in many states. It grows best in deep non-alkaline clay loams, medium black soils which are well drained but retain enough moisture are best for cultivation. Fig known to be affected by various diseases among them rust is caused by *Ceroteliuon fici,* which is severe in all the fig growing areas. A rust affected plant shows small, round brownish to black eruptive lesions on the lower surface of the leaves. The rust caused heavy defoliation of leaves and consequently reduces the yield. The rust can be controlled by various chemicals but new approach with respect to organic farming is the usage of cow urine has beem employed to assess the efficacy in UKP area of Karnataka. Sunflower is one of the important oilseed crop grown extensively in many states of southern India. The most important diseases affecting the crop are leaf spot, rust necrosis virus and powdery mildew diseases. Many diseases have been reported to reduce the sunflower yield. Powdery mildew is an important fungal disease more common under dry conditions towards the end of winter months. It produces white powdery growth on leaves, white to grey mildew appears on the upper surface of older leaves become chlorotic and die. Similarly, a new virus necrosis disease on sunflower showing necrotic symptoms causing severe yield losses has been reported to occur in and around Bangalore (1, 2) paralyzing the cultivation of this crop because of its fast spreading nature and severity. Rust of fig, powdery mildew and necrosis diseases of sunflower are controlled by many chemicals but using cow urine is an eco-friendly and new approach of diseases management. Hence, the present study was carried out under field conditions.

Methods

Studies on the management of fig rust was carried out under farmer's field in 1 ha area at Mudagal (Raichur district) and Kellur (Gulabrga district) during *kharif* of 2006. The experiment comprises two sprays of cow urine at 25 ml/liter of water thrice at 20 days interval and the control plot (no spray). Two liters of spray solution were given per tree. The observation on the incidence of rust disease were recorded using disease scale (0–9 score) at 15-day intervals from 10 days before spray up to harvest. The data on leaf area, fruit thickness, defoliation and yield were recorded.

Similarly, preliminary studies on management of

powdery mildew and necrosis of sunflower were conducted under farmer's field during *kharif* of 2006. The trial was made on large scale at three locations (Shiravar of Raichur, Doranahalli and Kakasagera of Gulbarga districts). The regular package of practices for high yield was followed and the cultivar used was hybrid, KBSH-1.

The studies consisted of two treatments viz. cow urine (T_1) sprayed thrice at 15-day intervals at 25 ml/liter at 35, 45, 55 DAS from 35 DAS and another plot was maintained with no spray for both powdery mildew and necrosis diseases. The observation on powdery mildew incidence was recorded using disease score (0–9 scale) from appearance of disease (35 DAS) up to 75 days. Similarly the weight of 100 seeds and yield at harvest were recorded and tabulated for further analysis.

The per cent disease incidence of necrosis was recorded at 15-day intervals from 30 days after sowing upto harvest by counting numbers of infected plants and total number of plants in the plot. The per cent necrosis was calculated using the formula.

$$\text{Per cent incidence (\%)} = \frac{\text{No. of plants infected}}{\text{Total no. of plant}} \times 100$$

Results and Discussion

The per cent disease of rust and defoliations in sprayed plot ranged from 3–4% when compared to control had 6 to 8.5% incidence. The cow urine spray treatment recorded least mean incidence (4.0%) and defoliation (2.5%) and high yield (6.5 tonnes/ha) compared to control that recorded high mean rust incidence (8.5%) and defoliation (14.8%) with low yield (3.5 tonnes/ha) (Table 1). Thus it can be concluded that cow urine (25 ml/liter) sprayed effective by controlled fig rust and increased leaf area, fruit thickness and yield. This is attributed to the nutrient composition and phenolic compounds present in the cow urine that improves the plant growth and compounds have toxic/inhibitory action against fungal growth and multiplication. This is in confirmation with Kuruchave and Jayarajan (3) who observed that animal dung and cow urine were found to inhibit tomato spotted wilt virus. Similar result was found by Palekar (4), who reported the usage of cow urine and dung for the control of diseases in natural farming practices.

The results of the study revealed that cow urine sprayed (25 ml/liter) plot recorded low incidence of 2.0% of powdery mildew and 2.60% of necrosis (Table 2). The high seed weight (4.32 g/100 seeds) and highest yield of 15.45 q/ha was recorded in sprayed plot compared to control plot which showed high powdery mildew (6.0%) and necrosis incidence (12.34%) with lowest yield of 10.70 q/ha. This indicates that cow urine sprayed at 35 DAS thrice has successfully controlled the powdery mildew, necrosis incidence and had maximum yield per unit area when compared to check plot that received no spray (Table 2). This may be attributed to the phenolic and other element present in the cow urine that may lead to virus inhibitory activity and suppression of the protein synthesis of virus particles.

The toxic compound present in cow urine inhibited the disease causing activity of the pathogen in plants and may restrict further development of the pathogen. Hence it is concluded that the nutrient elements and other enzymes present in the cow urine may trigger the systemic acquired resistance of host plant against pathogens by making plant to resist the pathogen infection. This is in confirmation with the report of Kuruchave and Jayarajan (3). Rajrathan (5) noted that the synthesis of leuco anthocayans in plant with in equate B levels enhanced the resistance of

Table 1. Efficacy of cow urine in management of rust disease and its effect on yield of fig. *Mean of two locations ; 0–9 scale was used.

	Treatments	Dosage (ml/l)	Rust (Score) mean percent incidence	Percent mean defoliation	Mean leaf area (cm)	Mean fruit thickness (cm)	Yield (tonnes/ha)
1	Cow urine (T_1)	25	4.0	2.5	25.4	4.44	6.50
2	Control no spray (T_2)	-	8.5	14.8	19.0	2.41	3.50

Table 2. Efficacy of cow urine against powdery mildew and necrosis diseases of sunflower. Rust : 0–9 scale, Necrosis : Per cent necrosis incidence.

	Treatments	Dosage (ml/l)	Mean Powdery mildew diseases incidence	Mean necrosis (PDI)	100 seed weight (g)	Yield (tonnes/ha)
1	Cow Urine	25	2.0	2.60	4.32	15.45
2	Control	-	6.0	12.34	3.83	10.70

those plant to fungal and insect attack. Cow urine contains more of micronutrients, responsible for resistance against necrosis and powdery mildew (6). But the exact mechanism of cow urine for resistance is still obscure hence further search in this direction is needed.

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